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Hartmut Sauer

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EXAMINER

HARRISON, NICOLE K

ART UNIT

PAPER NUMBER

1794

NOTIFICATION DATE

DELIVERY MODE

04/13/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/553,294 | Applicant(s) SAUER, HARTMUT | |
| | Examiner NICOLE HARRISON | Art Unit 1794 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 20-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2009 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 12, line 19 through page 14, line 10, filed 1/21/09, with respect to the rejection(s) of claim(s) 1-17 and 20 under 35 USC § 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the amendments made to the claims. Rejections are based on 35 USC § 112, 102, and 103 in view of newly found prior art.

Drawings

1. The drawings were received on 1/21/09. However, these drawings are objected to because the labels given for Figure 2 are not in English. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each

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drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 9 provides a limitation for the polymer of the non-magnetic substrate. However, the specification states that those polymers are for the non-metallic layer and not the non-metallic substrate.
3. The use of the trademark "Hart-Coat[®]" and "Kepla-Coat[®]" on page 10, lines 33-34 have been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the boundary layer" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation "the standard deviation" and "the adhesive strength of the metallic layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

6. Claims 9 and 13 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 9 and 13 both have improper Markush language. There should be a "consisting of" after "group." See MPEP 2173.05 (h), section I.

Claim Rejections – 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 6-8, 10, 11, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Gulla et al. (US Patent No. 3,562,038).

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Regarding claims 1, 3, 8, 10, 11, and 23, Gulla et al. teaches the metallization of a phenolic sheet, or non-metallic substrate (col.7, line 11) involving roughening the substrate by sanding, sandblasting, or abrading with a grit material(col.4, lines 19-21), contacting the roughened surface with a colloidal metal catalyst such as a stannic acid-palladium colloid (col.3, line 54), contacting the surface with a stripping solution whereby catalyst is stripped from the smooth surface of the substrate with sufficient catalyst (palladium) retained on the rough surface for metal deposition and the metal is plated by electroless deposition (col.4, lines 39-65), more specifically by electroless copper deposition (col.7, line 17). The palladium catalyst that is retained/impregnated onto the surface of the substrate can be considered the boundary layer between the substrate and the metal layer deposited thereon and thus does not contain calcium. Since Gulla et al. teaches the same type of process and materials as that given in the specification (blasting treatment, surface activation, and electroless deposition), the electrolessly deposited phenolic sheet (composite material) would be expected to have similar values for the adhesive strength and standard deviation of the adhesive strength. Additionally, the boundary layer would be expected to have similar roughness values as that given in the instant claims.

Although the prior art referenced uses a process that does not involve external current, “even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

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unpatentable even though the prior product was made by a different process.” In re Thorpe, 227 USPQ 964,966).

Regarding claim 6, the composite is also used in the formation of a one-sided through-hole circuit board from a copper clad on one surface of the phenolic sheet plastic laminate (col.9, lines 8-10) and therefore, the one surface of the non-metallic substrate is the surface of an article.

Regarding claim 7, the composite is also used in the formation of a two-sided copper clad laminate (col.10, lines 8-9) or circuit board and therefore, the non-metallic substrate is not the surface of the article.

5. Claims 1, 6, 8, 9, 11, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Belouet et al. (US Patent Publication No. 2003/0031803).

Regarding claim 1, Belouet et al. teaches a polymer substrate part coated with a composite material layer and subsequent copper deposition (0033 & 0034). The adhesion of the composite is 1.4 kg/mm^2 after metallization with copper, which is 13.2 N/mm^2 (0044). The composite material (boundary) layer is made of a polymer charged with zinc oxide particles and therefore, does not have any calcium content (0042). The metallic layer is deposited without external current. However, examiner notes that “even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

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unpatentable even though the prior product was made by a different process.” In re Thorpe, 227 USPQ 964,966).

Regarding claim 6, Belouet et al. teaches that the polymer part is the substrate of the composite and is therefore, the surface of the article (0033).

Regarding claims 8 and 23, Belouet et al. teaches a similar process and materials, and since the adhesion strength of the composite material is commensurate, any deviation along the surface of the boundary layer is expected to be similar to the claimed invention.

Regarding claim 9, Belouet et al. teaches that the polymer substrate part can be polycarbonate (0042) or a flexible plastic such as polyethylene or polyimide (0053).

Regarding claim 11, Belouet et al. teaches that the metal layer deposited is copper (0044).

Claim Rejections – 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 2, 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet et al. as applied to claim 1 above, and further in view of Zweben et al. (US Patent No. 4,888,247).

Regarding claims 2 and 4, Belouet et al. fails to teach there being a first non-metallic layer and a second metallic layer applied to the composite. However, Zweben et al. discloses a heat conducting laminate fabricated from alternating at least one layer of metal and at least one layer of a polymer matrix composite material embedded with a reinforcing material (col.5, lines 11-15). The metal layer can be made of copper, nickel, or gold (col.6, lines 8-10). The polymer matrix can be made of polyester, epoxys, polyimides, or polyamides (col.7, lines 53-56). The reinforcing material can be inorganic fibers made of carbon (col.10, lines 16-20). At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Zweben before him or her, to modify the composite of Belouet et al. to include the non-metallic layer and metallic layers of Zweben because they produce a laminate with high thermal conductivity (col.2, lines 46-48).

The process used to produce the laminate does not involve chemically pretreating the laminate and does not use a chemical reduction process (col.21, lines 68-69; col.22, line 1). However, examiner notes that "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of

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production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 227 USPQ 964,966).

Regarding claim 21, the diameter of the inorganic fibers should be no greater than about one-tenth the thickness of the layer of polymer matrix material in which it is incorporated (col.13, lines 9-13). Generally, the polymer matrix layer has a thickness of less than about 1.0 cm (col.7, lines 61-63). Therefore, the diameter of the fibers should be no greater than 1000 μm . However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the diameter of the fibers for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Zweben et al. before him or her, to modify the composite of Belouet et al. to include the reinforcing material of Zweben because the reinforcing material (carbon fiber) helps improve bonding of the layers and improves the strength of the laminate (col.9, lines 30-32). Additionally, the diameter of the fibers were chosen so that they would become an integral part of the polymer matrix material, but not enough to separate the polymer composite layer from the metals layers (col.13, lines 20-22).

9. Claims 3, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet et al. (US Patent Publication No. 2003/0031803) as applied to claim 1 above.

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Regarding claims 3 and 5, Belouet et al. teaches that the polymer substrate part can be reinforced with glass fibers (0056) and that using dielectric nanoparticles in the composite material layer results in the surface of the substrate having a very smooth surface (0036), but does not teach a surface roughness value. It would have been obvious to one of ordinary skill in the art at the time of invention to adjust the smoothness (roughness) of the non-metallic substrate in order to increase adhesion of the metallic layer to the polymer substrate part. Since the instant claim states that the maximum Rz value is 100 μm , it is consistent with Belouet et al.'s desire for the surface of the substrate to be smooth, which results in a lower roughness value.

Regarding claim 7, it would have been obvious to one of ordinary skill in the art at the time of invention to have the non-metallic substrate to not be the surface of the article. The position of the non-metallic substrate would depend on the intended use of the article.

10. Claims 10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet et al. (US Patent Publication No. 2003/0031803) as applied to claim 1 above, and further in view of Metzger et al. (US Patent No. 3,617,363).

Regarding claim 10, Belouet et al. fails to teach the metal layer being a metal dispersion layer. However, Metzger et al. discloses the electroless deposition of a metal, such as nickel (col.1, line 75) having dispersed therethrough a quantity of wear-resisting particles (col.2, lines 1-2).

Regarding claims 12-14, the non-metallic wear-resisting particles can be silicon carbide (col.3, line 14), oxides of aluminum, boron carbides, synthetic organic plastic resin powders, molybdenum sulfides, and boron nitrides (col.4, lines 40-49).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Metzger et al. before him or her, to modify the metal layer of Belouet et al. to include the non-metallic particles of Metzger et al. because the particles increase the wear-resistant properties and hardness of the metal layer (col.2, lines 6-9).

11. Claims 10, 15-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet et al. (US Patent Publication No. 2003/0031803) as applied to claim 1 above, and further in view of Suzue et al. (US Patent No. 6,088,947) and Nissen (European Patent No. EP-112439).

Regarding claim 10, Belouet et al. fails to teach the metal layer being a metal alloy or metal dispersion layer. However, Suzue et al. discloses that the metal forming the metal film can be stainless steel, which is a metal alloy (col.3, lines 6-7). At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Suzue et al. before him or her, to modify the composite material of Belouet et al. to include the metal layer of Suzue et al. because the color appearing as the exterior can be made to be brighter than the color obtained from only the coating layer in addition to providing corrosion resistance (col.3, lines 7-10).

Regarding claims 15 and 16, Belouet et al. fails to teach a layer of aluminum, titanium, or their alloys applied to the metal layer of the composite. However, Suzue et

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al. discloses that that the metal film deposited by electroless deposition can be composed of a plurality of metal films (col.3, lines 11-12) including Al, Ti, and other metals (col.3, lines 2-5). Suzue et al. teaches the formation of a metal film to form a desired coloration on an exterior of an article. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Suzue et al. before him or her, to modify the metal layer of Belouet et al. to include the additional metal layers of Suzue et al. because by combining the plural films, a variety of hues can easily be expressed (col.3, lines 12-13).

Suzue et al. fails to teach the metal alloy layer's surface being anodically oxidized. However, Nissen discloses the anodic oxidation of aluminum alloys. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Suzue et al. and Nissen before him or her, to modify the surface of the metal alloy layer of Suzue et al. to include the anodic oxidation process of Nissen because it produces a hard, thick, even oxide layer having good mechanical properties, such as abrasion resistance (Derwent abstract).

Regarding claims 17 and 20, Suzue et al. discloses the addition of a single-color forming coating film above the metal layer that can be made of TiO_2 or Al_2O_3 (col.3, lines 40-42). Suzue et al. discloses that one of the film materials may be alumina and it would have been obvious to one of ordinary skill in the art at the time of invention to form the decorative layers of materials to achieve the desired coloration or aesthetic effect. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Suzue et al. before him or her, to

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modify the composite of Belouet et al. to include the ceramic oxide layer (single-color forming coating film) of Suzue et al. because it reflects components in specific wavelengths to express only one color (col.3, lines 44-46) and not a rainbow because of interference (col.4, lines 11-12).

12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet et al. (US Patent Publication No. 2003/0031803) as applied to claim 5 above, and further in view of Shaw et al. (US Patent No. 4,643,940).

Belouet et al. teaches that the polymer substrate part can be reinforced with glass fibers, but fails to teach the diameter of the fibers is more than 10 μm . However, Shaw et al. discloses that glass fibers suitable for reinforcing plastic resins have an average length from about 3-25 mm and an aspect ratio of (length to diameter ratio) of at least 40 (col.3, lines 36-40). For example, if 0.125 inches was the length of the glass fiber, then the diameter would be at least about 79 μm . At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Belouet et al. and Shaw et al. before him or her, to modify the composite material of Belouet et al. to include the fiber reinforced plastic of Shaw et al. because the reinforced polymer substrate part would be light weight and provide high flexural strength and flexural stiffness (col.1, lines 21-23).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE HARRISON whose telephone number is (571)

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270-3741. The examiner can normally be reached on Monday through Thursday, 9 am - 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571) 272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

NH